

VEX U PYRO Robotics - Rossum Rumlbers Robotics Club

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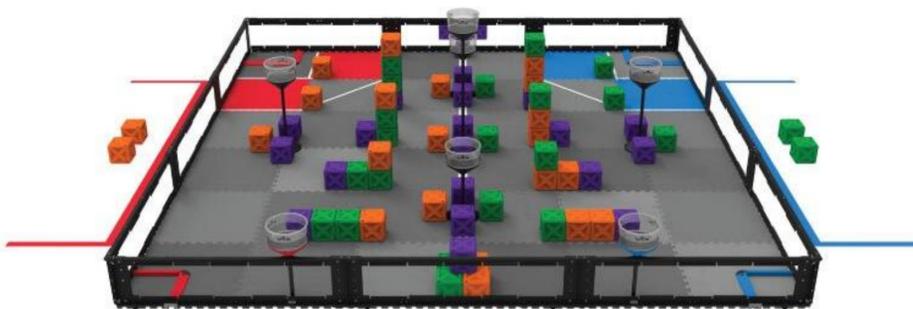
The Polytechnic School

Competing in the VEX U 2019-2020 Game: VEX Tower Takeover

Background

The VEX Robotics Competition, presented by the Robotics Education & Competition Foundation, is one of the world's largest robotics competitions. Each year, an engineering challenge is presented to elementary, middle school, high school, and university students. Students are tasked to build innovative robots and compete with the ultimate goal of qualifying for and winning the World Championship in Louisville, Kentucky held every April.

This Year's Game Challenge



VEX Robotics Competition "Tower Takeover"

The Game: *VEX Robotics Competition "Tower Takeover"* is played on a 12'x12' field as seen above. Two Alliances – one "red" and one "blue" – composed of two robots each (one 24" cubed and one 15" cubed robot), compete in matches consisting of a forty-five (0:45) second *Autonomous Period* followed by one minute and fifteen (1:15) second *Driver Controlled Period*. The object of the game is to attain a higher score than the opposing Alliance by placing *Cubes* in *Towers*, or scoring *Cubes* in *Goals*. An additional bonus is awarded to the Alliance that has the most points by the end of the *Autonomous Period*.

Our Approach

As the world grows increasingly complex, with a myriad of global challenges on the horizon, there is an even greater need for individuals equipped with the knowledge and skills to tackle tough problems by gathering information, evaluating it, and presenting effective solutions. Still, relatively few students are proficient in the core subjects of science, technology, engineering, and mathematics (STEM), and even fewer express interest in pursuing these fields beyond high school.

By its nature, the study of competitive robotics not only encompasses all four pillars of STEM education, but also encourages important life skills like teamwork, communication, and project-based organization. The members of PYRO Robotics aim to give every student the opportunity to be inspired by the excitement of hands-on STEM learning and for all students to be able to apply what they have learned in the competition to their careers after graduation.



Team PYRO at the Embry-Riddle Scrimmage on 11/2.

Accomplishments

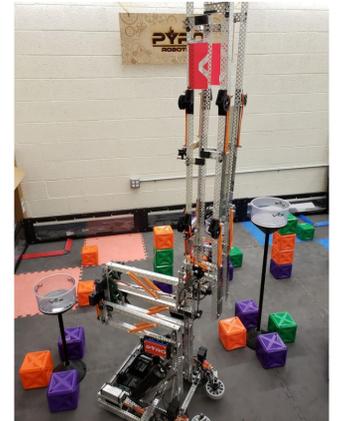


PYRO robots on the practice field at Purdue Qualifier on 2/21.

This year, our team qualified for VEX Worlds for the third consecutive year at the Purdue University Qualifier in February. Our team has taken home four awards at both of the tournaments we have competed at this year, including two Design Awards, a Tournament Champion Award, and a Robot Skills Award.

Our Robots

24" Robot:
"Megatron" is designed to rapidly intake 10 cube stacks and place cubes in all towers. This is accomplished with a fast double reverse 4-bar lift and passive hooks. The lift allows grabbing the premade stacks on the field. Megatron is capable of scoring 11 cube stacks independently and placing a stack on top of another. This allows for a maximum stack height of 17 cubes. The robot uses a total of 14 motors and 4 pneumatic pistons as well as weighing about 43 lbs.



"Megatron"



"Stella Urlare"

15" Robot:
"Stella Urlare" is limited by a much smaller build volume therefore requiring a simpler design. The intake quickly collects and orients cubes from the ground as well as lifts individual cubes. The cubes are stacked and held at an angle on a tray. The arms allow for scoring in the low and middle height towers. Stella Urlare has a 9 cube capacity tray that quickly places stacks by rotating forward. The active cube lock allows for the robot to lift a cube and score it in a tower while holding a stack of cubes.

Acknowledgments

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